CARNIVOROUS PLANT NEWSLETTER

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Journal of the International Carnivorous Plant Society

Volume 28, No. 3 September 1999

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Journal of the International Carnivorous Plant Society
www.carnivorousplants.org

Volume 28, Number 3
September 1999

Front Cover: *Drosera* × *corinthiaca*. Note the compact rosette on a short, distinctive stem, the weakly curved base of the scape, and the yellowish tinge to the leaves. *Drosera aliciae* grows in the background. Article on page 81.

Back Cover: *Drosera regia*, see article on page 76. Photo by Ron Parsons.

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ICPS, Inc.
PMB 330
3310 East Yorba Linda Blvd.
Fullerton, CA 92831-1709, USA
icps@carnivorousplants.org

President	Jay Lechtman, (703)724-3886, email: jay@carnivorousplants.org
Vice President	Carl Mazur, (905)945-7816, email: carl@carnivorousplants.org
Membership Coordinator	Rick Walker, email: rick@carnivorousplants.org
Board Member	Madeleine Groves, email: madeleine@carnivorousplants.org
Board Member	Joe Mazrimas, email: joe@carnivorousplants.org
Seed Bank	Tom Johnson, email: tom@carnivorousplants.org, seedbank listed in this issue
Web Ring	Derek Glidden, email: derek@carnivorousplants.org

Editors:
Barry Meyers-Rice, P.O. Box 72741, Davis, CA 95617, USA, email: barry@carnivorousplants.org
Jan Schlauer, Zwischenstr. 11, D-60594 Frankfurt, Germany, email: jan@carnivorousplants.org
Page Layout: Steve Baker, email: steve@carnivorousplants.org

Business Manager: Leo C. Song, Jr., (714)278-2766, email: leo@carnivorousplants.org

Date of effective publication of the June 1999 issue of Carnivorous Plant Newsletter: 4 June 1999.
Accredited with the International Association for Plant Taxonomy for the purpose of registration of new names of vascular plants (excluding fossils).

The ICPS is the International Registration Authority (IRA) for cultivated carnivorous plants according to The International Code For The Nomenclature of Cultivated Plants. Send relevant correspondence to the ICPS, Inc.

PUBLISHER: ICPS, Inc., Fullerton, California. Published quarterly with one volume annually. Desktop Publishing: Steve Baker, 5612 Creek Point Drive, Hickory, NC 28601. Printer: Kandid Litho. Logo and masthead art: Paul Milauskas. Dues: $20.00 annually. $25.00 foreign. Reprints available by volume only

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ISSN #0190-9215. Circulation 866 yearly.

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BOTANICAL GARDEN

Letter from the Editor: Here Comes 2000!

Barry Meyers-Rice

Now I must ask ICPS members to do something I have never asked before—sort through your trash!

I think that somewhere in your garbage is the envelope this issue of Carnivorous Plant Newsletter arrived in. Go find it. Now.

Look at your name on the mailing label. It is followed by four digits (your membership number), and another four digits (the last year your membership will be active). If that year is 1999, use the form in this issue to renew your membership. Please copy your membership number onto the renewal form—this helps us process your paperwork. Please consider renewing for more than one year at a time. Multiple-year memberships are convenient time savers for you and us, and while you do not get a discount, you do get protection from membership rate increases—it seems that everything is getting more expensive! If it feels like you just recently renewed your membership, that is because we sent the last form out in December. That did not give some people enough time to renew, so by having an earlier renewal the ICPS will have less back-issues to ship.

I will keep this notice short so we will have more room to talk plants. So read....and renew!

Looking Back: CPN 25 years ago

Don Schnell wrote about species of *Exyra*—the moths whose larvae live inside and feed on *Sarracenia* pitchers—and how they interact with birds and wildfires: "But before pupating, the larvae open two holes [inside the pitcher]: one very low to drain any water that might get in, and one above the frass for later egress of the adult moth which does not have the mouthparts to chew its way out....Certain birds have come to recognize the meaning of the telltale holes and slash open the pitchers near the bottom to feed on the pupae.... [Wildfires] will effectively destroy the overwintering larvae and pupae of *E. ridingsii*. Strike, counterstrike, and now another strike: *E. semicrocea* frequently overwinters or pupates outside of the pitcher very low to the ground and effectively insulated from the rapid fire."

Drosera arcturi in Tasmania and a Comparison With *Drosera regia*

Robert Gibson • P.O. Box 1330 • Dubbo• New South Wales 2830 • Australia
Keywords: observations: *Drosera arcturi, Drosera regia.*

Drosera arcturi in the wild

The Alpine Sundew *Drosera arcturi* is endemic to alpine, subalpine, and cool humid coastal areas of south eastern Australia and New Zealand (Erickson, 1968). It is an interesting, rhizomatous, winter deciduous perennial with a history stretching back over fifty million years (Macphail, 1988). The Tasmanian populations include significantly larger plants than those which occur elsewhere in its range. From my observations this form has many similarities with *D. regia*, from South Africa. I compare the two in this paper.

Drosera arcturi is typically a small growing species with three to five erect, linear leaves 2 to 5 cm long that are produced over a four month period (October—February). Mature plants produce a single erect scape up to 5 cm tall which carries a single white-petalled flower. The flower is open in January. Around Mt. Kosciusko, New South Wales and near the summits of Mt. Bogong and Mt. Baw Baw, Victoria, the sundews grow in colonies in damp peat, often growing with mosses and low herbs (including *Utricularia monanthos*) at the boggy beginnings of small streams and beside lakes. The typical form of the species is often difficult to find in the wild due to its small stature. In all areas this species experiences prolonged freezing conditions, often moderated by lingering snow cover.

In 1991 and 1997 I undertook fieldwork in Tasmania which included observing *Drosera arcturi* in the wild and studying herbarium specimens. The Tasmanian plants are unusual in that they include more robust plants with leaves up to 25 cm long. The flowering parts are twice the size of the typical plants. There are up to three flowers per scape.

In Tasmania *Drosera arcturi* is found from near sea-level (in the southwest portion of the island) to over 1400 m elevation on peaks of the central plateau. At low elevations it grows in buttongrass sedge swamps, and at high elevations it grows on lake edges and low alpine to subalpine herb fields, often in the company of large cushion plants. Several plants grow in bright green cushion plants near the summit of Mt. Wellington at approximately 1200 m, within 30 km of the center of the city of Hobart.

Drosera arcturi in Tasmania produces a horizontal rhizome measuring up to 15 cm long, at or just under the soil surface. From this descend many thin black roots with conspicuous root hairs. Additional growing points emerge from the rhizome over time. Each season three to five tough, almost succulent leaves are produced. The last two leaves produced each summer in January do not immediately grow to maturity but form a tight inverted conical bud which protects the apical meristem of the plant during winter. These leaves recommence growth in September and are non-carnivorous, lacking stalked retentive glands. This is especially visible in flowering individuals. From October to January three erect linear leaves are produced of which the second leaf is the longest. The leaves of *D. arcturi* are folded along their length and grow by simple elongation, opening flat as they mature; a growth pattern with some similarities to that of *D. burmannii* and tuberous rosetted *Drosera*

except that the leaves lie flat on the ground. They retain a furrowed base which may protect the younger leaves from cold weather during the growing season. The leaves lack a raised midrib, and the retentive glands held on long mobile stalks are restricted to the upper surface of the lamina.

In November a single scape emerges from the base of the first new leaf of the season. They grow directly up by stem elongation in a similar way to *D. binata* and *D. regia*, and reach up to 20 cm tall. The scape may have one small linear bract. One to three flowers are produced which open for a few days each in January. The flowers have white petals as long as 1.2 cm long (Figure 2). The petals surround an ovate green ovary, topped by three or four short white styles which are surrounded by five white stamens which produce yellow pollen. The extent of flower opening depends more upon air temperature than light levels. My last visit to a site on the west coast of Tasmania coincided with a period of hot weather (35°C) during which the *D. arcturi* flowers were fully open with horizontally held petals and sepals. They only began to close a little at dusk. Under other circumstances I have seen flowers which were only open enough to expose the styles and tip of the stamens. With the flowers fully open I observed that the anthers are held at the same height as the styles and that from the distribution of orange pollen on the styles most flowers appeared to have self-pollinated. During the summer the air temperatures are generally cool and the flowers only expose the styles and anthers. From the arrangement of the flowering parts it appears the pollination syndrome employed by this species utilizes flying insects landing on the styles, and subsequently contacting the stamens.

The seed is black, smooth, pyriform and up to 2 mm long; and is almost identical to that of *Dionaea muscipula*. It is shed from the top of the ripe fruit in March and requires exposure to cold weather before germinating the following spring.

Drosera arcturi is a slow grower. Each year mature plants produce approximately 1 cm of rhizome. It grows in a range of soils, including sedge peat, *Sphagnum* moss, cushion plant and coarse quartzite gravel. The *D. arcturi* rhizome is generally above ground when growing in gravel, but is shallowly buried in the softer, organic substrates. Periodic fires may also burn the upper surface of the peaty soil, killing many plants. Those plants growing on the surface of gravelly soils usually escape being burnt.

Much time and patience would be needed to grow this species to maturity. For example, a seedling approximately two years old was found at one site in early 1997. It had only two leaves, 4 mm long by 2 mm wide. In view of the climate of the south west of Tasmania this species may be grown most easily in western Europe and the north west coast of the USA and adjacent British Columbia.

The size of leaves and number of flowers produced by *D. arcturi* plants are variable and the larger plants grow in the southwest part of the island state. A reason for this may be due to the temperature ranges during the growing season. Cool minimum temperatures, including light frosts, occur year round on the central plateau. In contrast, warmer minimum temperatures occur on lower elevations in the southwest. In these regions cool moist winds of the "Roaring Forties" flow over the land, so the climate is humid, cloudy, with high average annual rainfall. Cultivation experiments combined with weather data from a number of sites would be useful in quantifying the influence of climate on the size of plants from around the state.

Drosera regia in the wild

In July 1997 I visited the principal site of *Drosera regia* in South Africa, observing the conditions in which it grows in the wild. These supplement observations on

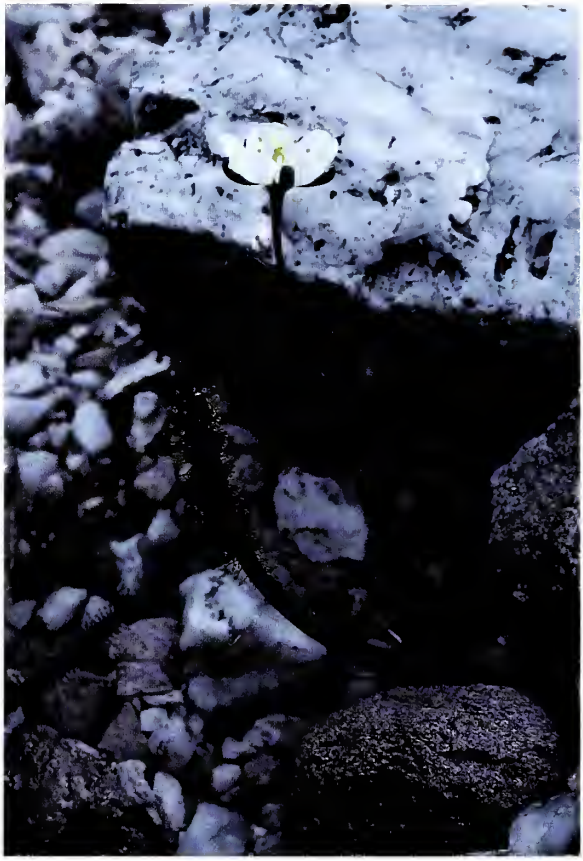

Figure 1: *Drosera arcturi* from Tasmania.

Figure 2: Three open flowers of *Drosera arcturi*. Note that the central flower has six petals and that these flowers have an extra stamen.

plants in cultivation. *Drosera regia* is known from a single valley in the Baviaanskloof in permanently damp soil (Stephens, 1926). The site visited (the lower of two) is a gravel bench on the floor of poorly formed creek bed. Water flows from an area under a quartzite knoll, possibly from a soak. From the steep valley slopes rockfalls and landslides have shed a mantle of angular cobbles and boulders over the valley floor. The frequency of mass movement appears to have declined in the valley—no recent landslide scars or large rockfalls were evident. The soil contains a significant amount of sand and vein quartz gravel originating from granular diaggregation of quartzite, and a variable amount of peat.

The sundews grow in peaty sand, often along the edge of angular cobbles, and also in areas with a surface cover of gravel over moist peaty sand. When the plants grow in surface gravel, the rhizomes are below ground. When the plants grow in peaty sand soil, the rhizomes are above the surface amongst grasses and sedges. In mid-July the plants were emerging from dormancy. Seedlings and two plants in gravel had bedewed fully open leaves, the first of the season, whilst the rest of the plants had lengthening dormant buds. The plants were dormant and initially hard to find until the dead, black leaves and few dead scapes amongst grasses and sedges were recognized. The vegetation of this bench included a *Leucodendron* sp., and members of Cyperaceae, Iridaceae and Restionaceae.

Comparison of the robust *Drosera arcturi* variant with *D. regia*

Both *Drosera* posses similar architectures, a horizontal woody rhizome from which a crown of erect linear leaves emerges. They grow in permanently moist, generally open conditions amongst herbs and low shrubs which are periodically burnt. Both species grow in the warmer months and form a tight winter bud of immature, modified leaves. Exposed rhizomes are killed by fire, however *D. regia* has the ability to resprout from any undamaged roots (Green, 1997). In both species the scapes grow vertically, lacking the circinate vernation developed in most other *Drosera*.

They differ in leaf growth pattern, number of flowers per scape, flower color, size and pollination strategy, leaf mobility, distribution and climatic zone. In *D. regia* the leaves are folded along their length but also grow by circinate vernation; uncurling as they grow. The undersurface of the leaf blade (but not either side of the conspicuous midrib) and the sepals and bracts of the inflorescence are covered in small sessile red retentive glands. Both the leaf blade and the stalked retentive glands are capable of folding over prey. The scapes have two primary branches bearing a total of five to twenty flowers, which have large pink unscented petals, 2 to 3 cm long (see Back Cover). The ovary is surmounted by three unbranched spreading styles, and is surrounded by five erect stamens which describe a smaller circular area than the styles. The arrangement of the stigmas and anthers minimizes the chance of self-pollination and experiments have shown that the pollen is compatible only with genetically different plants (Green, 1997). Frost occurs infrequently in Baviaanskloof. Many of the important similarities and differences of *D. arcturi* and *D. regia* are summarized in Table 1.

In the initial description of *Drosera regia*, Stephens (1926) placed this species in section Psychophila, which was then comprised of *D. arcturi, D. stenopetala* and *D. uniflora*, although she noted that the multiflowered scape was atypical for this group. Since then both *Drosera arcturi* and *D. regia* have been placed in their own

sections, Arcturia and Regiae respectively (Seine and Barthlott, 1994). Whilst *D. regia* is separated from all other members of the genus by its operculate pollen, of all the other members of the genus it is most similar in morphology, growth habit and pattern and, presumably, antiquity, to *D. arcturi*, especially the robust form from Tasmania in which many common features are readily observable.

Acknowledgements:

I wish to thank Eric Green, in Cape Town, for his assistance with all field work undertaken in South Africa and for many fruitful discussions on plants. I also wish to thank Dr. John Rourke, Director of the Compton Herbarium, Cape Town, for access to the library and herbarium material.

Table 1

Feature	*Drosera arcturi*	*Drosera regia*
Leaf size and shape	Linear, to 25 cm × 1 cm.	Linear, to 60 cm × 2 cm.
Leaf Vernation	Grows straight.	Weakly circinate vernation.
Stipules and petiole	Absent.	Absent.
Growing season	October to February.	October to April or year-round (variable).
Scape growth	Straight up, uncurled.	Straight up, uncurled.
Flowering	January.	January.
Flowers	1 to 3, white with anthers extending beyond the styles, can self-pollinate.	10 to 30, pink, with flat styles extending beyond the stamens, cannot self-pollinate, not self-compatible.
Styles	3 or 4 undivided.	3-undivided.
Seeds	Pyriform, black, shiny to 2 mm long by 1 mm diameter.	Linear, ornamented, to 2 mm long by 0.5 mm diameter.
Woody Rhizome	Present.	Present.
Dormant bud	Tight vertical inverted cone of two immature leaves.	Tight cluster of short, immature leaves.
Root system	Many thin black roots with root hairs on the entire length.	Few thick, fleshy roots with root hairs on the terminal 15 cm.
Asexual reproduction	Gradually branching rhizome.	Infrequently branching rhizome, especially after flowering; and from the roots.
Glands beyond lamina upper surface?	None.	Sessile glands on lamina undersurface and stipules.
Distribution	Tasmania 0—1400m elevation.	South Africa, in a valley northeast of Cape Town, 500—900 m.

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Drosera × *corinthiaca* (Droseraceae), A Newly Recognised Natural Hybrid From The Cape Province, South Africa

Robert Gibson • PO Box 287 • Penrith • New South Wales, 2751 • Australia
Eric Green • 11 Wepener Street • Southfield • Cape, 7800 • Republic of South Africa

Keywords: new taxa: *Drosera* × *corinthiaca*, South Africa.
Received: 21 October 1998

Abstract

Drosera × *corinthiaca* Gibson and Green, the natural hybrid between *Drosera aliciae* Hamet and *D. glabripes* (Harvey) Stein is described, illustrated and named. It occurs in the Cape Province of South Africa.

Introduction

Drosera × *corinthiaca* hybr. nov. is known from the type location in the Kleinriviersberg mountains, where it was initially recognised by one of us (E.G.) as a hybrid. It is likely to also occur in the Kogelberg where both parental species grow in close proximity. Its natural range is thus highly localised but protected in nature reserves. It resembles a short-stemmed form of *Drosera glabripes* with a relatively tall scape and flowers with twice-bifurcated styles. The latter characteristics are inherited from *Drosera aliciae*.

Taxonomy

Drosera × ***corinthiaca*** Gibson & Green, *hybrida nova D. aliciae* Hamet × *D. glabripes* (Harv.) Stein

Caulis 2-15 cm longus. Folia spiraliter disposita, stipulis 5-7mm longis, trilobis, lobis lateralibus subulatis, lobo medio diviso in lobulos 4 subulatos; petiolo 15-18mm longo, supra fere glabro subtus piloso, lamina 15-25mm × 3-5mm, obovata, supra et margine glanduloso-pilosa, subtus pilosa. Scapus 1, prope caulis apicem lateraliter oriens, 15-20cm longus, e basi paullo curvatus adsendenti-erectus, basin versus nonnunquam sparse pilosus praecipue apicem versus minute glandulosus. Inflorescentia 8-13-flora, bracteis 4mm subulatis glandulosis, pedicellis 7-9mm longis glandulosis. Sepala 5, 4-5mm × 2-3mm, basi connata, elliptica, glandulosa. Petala 5, 10-11mm × 7-8mm, obovata, rosea. Stamina 5, filamentis 2-3mm longis. Ovarium 1.2 × 1.4mm globosum glabrum, stylis 3, 5mm longis, basi bipartitis, segmentibus omnibus stylorum iterum bifurcatis. Semina fusiformia.

Typus: Fernkloof Nature Reserve, middle western slopes of Platberg overlooking Hemel-en-Aarde. 500 metres. Grid Ref: 3419AD - Caledon, Cape Province, Republic of South Africa. December 12, 1997, R. Gibson 1001 (*holo*: NBG 759 343).

Perennial herb; stem erect, up to 150mm tall with age, c. 2mm diameter, with a terminal active solitary leafy rosette, the leaves below the rosette persistent.

Leaves spathulate, up to 25mm long by 5mm wide; the blade obovate (6-)8-9 × 4-5mm on a straight-sided petiole 15-18mm × 3-4mm, abaxial surface fully covered by white appressed hairs, petiole margin often weakly recurved. The adaxial surface of the lamina and adjoining half of the petiole glandular hairy. Stipules white, free, c. 7 × 4mm, divided half to the base into 3 unequal lobes, those on the margin subulate, that in the middle broadly triangular and further divided three-quarters of the way to the base into 4 equal subulate lobes. Inflorescence ascending, 150-200 × 1.5mm with a moderate density of scattered red, very short stalked glands along its length and extending to the pedicels, bracts, and calyx; the basal 8-10mm with scattered white hairs similar to those on the abaxial leaf surface. Bracts subulate, to 4mm long. Pedicels 7-9mm long. Sepals 5, elliptic 5 × 2mm. Petals 5, dark pink, obovate, free end truncate, 10-11 × 7-8mm. Stamens 5, the filaments white, 2-3mm, the connective swollen. Anthers paired, yellow. Ovary green, glabrous, obovoid c. 1.2mm tall, c. 1.4mm diameter at anthesis, carpels 3. Styles 3, horizontal, bipartite, cerise, 5mm long, each segment divided again by two thirds into 12 ultimate style segments. The stigma lobes once bifurcated, oblong, with bristles. Probably sterile. (Figure 1).

Drosera × *corinthiaca* differs from *Drosera aliciae* (whose features are given in parentheses) by the formation of a stem at maturity (rosette is flat and at ground level, or at most on a very short pedestal); 1mm internodes between the leaves (no internodes); stipule with three primary lobes in which the central broadly triangular lobe is subdivided into 4 subulate lobes (central stipule lobe is broadly triangular, with an entire or bifurcated tip); and leaf spathulate with the petiole margin often weakly recurved (leaf obcuneate to broadly spathulate, bi-convex in section).

Drosera × *corinthiaca* differs from *Drosera glabripes* (whose key features are given in parentheses) by 1mm internodes (>2mm internodes); stipule deeply incised into three primary, unequal lobes, the lateral ones subulate and the central broadly triangular one is deeply subdivided into 4 subulate lobes (stipule weakly divided into three unequal lobes, the lateral ones subulate and the central broadly triangular one is deeply divided into 6 subulate lobes; leaf spathulate, with petiole margin often weakly recurved (leaf narrowly spathulate, petiole margin moderately recurved); scape over 150mm tall (scape under 150mm tall); style segments twice bipartite (style segments once bipartite).

This natural hybrid superficially resembles a short form of *Drosera glabripes*, with close-spaced wider leaves. The taller scape and more divided style segments are more typical of *Drosera aliciae* (see Front Cover).

Distribution and Habitat: *Drosera* × *corinthiaca* is known only from the Kleinriviersberg (Figure 2). However, given its origin as a sterile natural hybrid, it is likely to occur in other locations where both parental species grow in close proximity, such as the Kogelberg. It grows in permanently moist peaty sandy soil on the edges of swamps and small creeks, often amongst *D. aliciae*.

Flowering Period: December to January.

Conservation Status: *Drosera* × *corinthiaca* is only known from the type location where it is locally common, and where both parental species grow within 20 metres from each other. It is also likely to occur in other areas of the Kleinriviersberg and the nearby Kogelberg where similar geomorphological conditions occur. Although the maximum potential range of this hybrid is not large the main habitats are within nature reserves.

Etymology: The epithet, *corinthiaca*, from the Greek *Korinthos*, refers to the Corinthian column-like appearance of the mature plant.

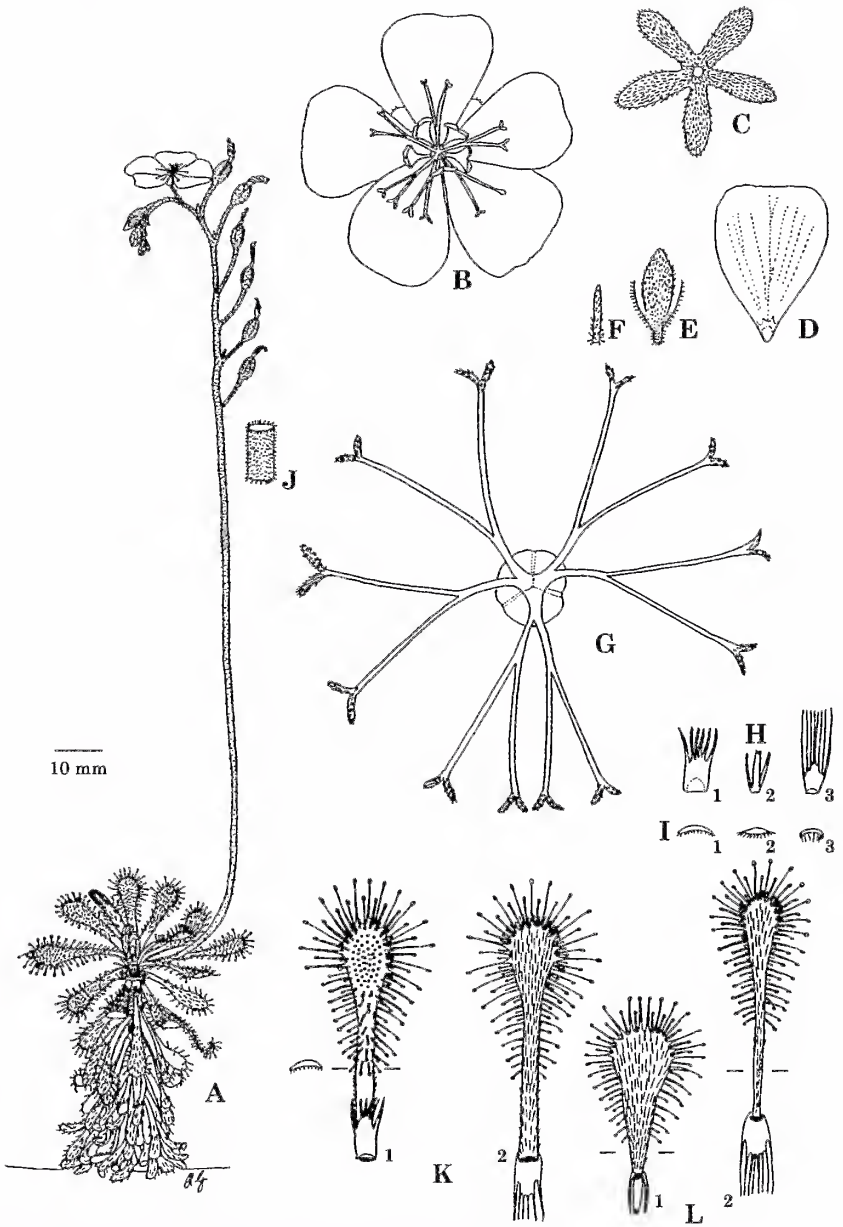

Figure 1: *Drosera* × *corinthiaca* A - mature plant × 1; B - open flower × 3; C - calyx × 3; D - petal × 3; E - sepal × 3; F - bract × 3; G - gynoecium × 10; H - stipules × 2, 1=*D.* × *corinthiaca*, 2=*D. aliciae*, 3=*D. glabripes*; I - petiole sections × 2, 1=*D.* × *corinthiaca*, 2=*D. aliciae*, 3=*D. glabripes*; J - scape cross section × 3; K - *D.* × *corinthiaca* leaf × 2, 1=adaxial surface, 2=abaxial surface; L - abaxial leaf surface × 2, 1=*D. aliciae*, 2=*D. glabripes*. Drawing from Gibson 1001. The stipules (H:2,3), leaf cross-sections (I:2,3), and abaxial surfaces (L:1,2) of the parental species are shown for comparison. Bars on leaf sections (K:1, L:1,2) indicate locations of leaf cross sections. Scale bar = 10mm at 1 ×.

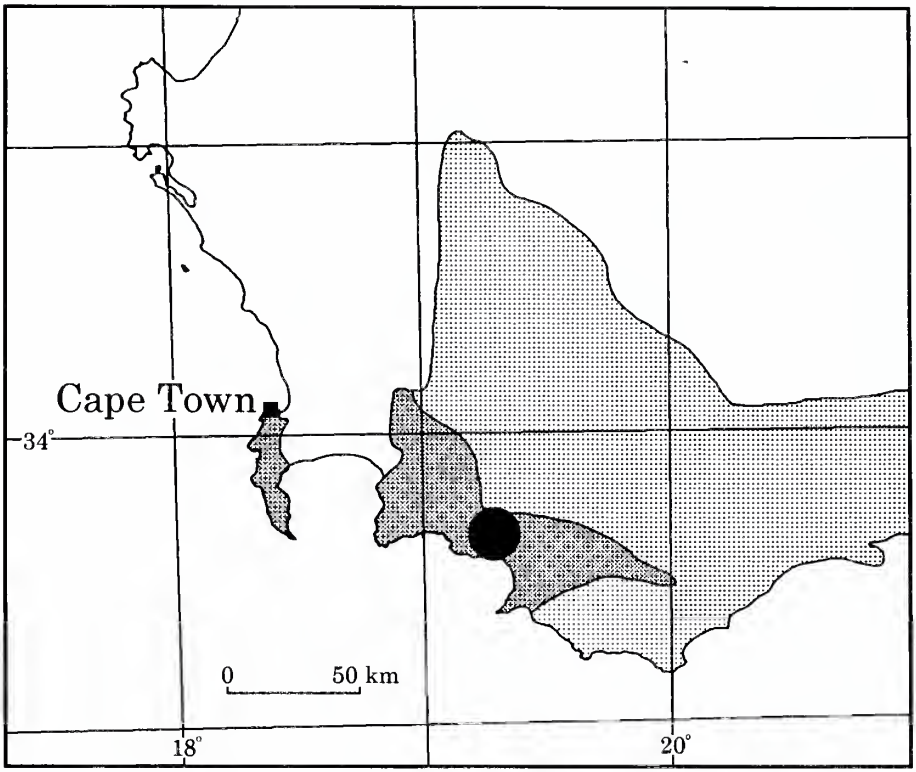

Figure 2: Distribution map of *Drosera* × *corinthiaca*. The type location is marked by a dot. The western range of *Drosera aliciae*, the probable seed parent, is indicated by dots, and the range of *Drosera glabripes*, the probable pollen parent, is indicated by light grey. This hybrid may occur spontaneously wherever both species grow in close proximity.

Discussion: This hybrid is probably sterile, given field relations of this hybrid to its probable parent, and from the study of other hybrids within the genus (Cheek, 1993). It is likely that this hybrid may reproduce asexually from the sparse, moderately swollen rootstock, especially after the above-ground growth has been cleared by not infrequent fynbos fires. Before the time of collection only two juvenile plants were known, but a nearby colony with many mature plants was found. This enabled the tentative identification of the parentage to be confirmed, especially as they grew amongst *D. aliciae* (the seed parent) in soils too damp and peaty for *D. glabripes* (the pollen parent), which grew amongst rocks and in well-drained sandy soil on the adjacent hill slope. Occasionally rosettes of *D.* × *corinthiaca* become bright yellow in colour; similarly the only other locally known *Drosera* hybrid (*D. aliciae* × *D. capensis*), may become very pale green.

Acknowledgments

The assistance and support of Dr. John Rourke and the other friendly staff at the Compton Herbarium, Cape Town is gratefully acknowledged. I also wish to thank Dr. Jan Schlauer for his assistance with the Latin description.

Reference

Cheek, M. 1993, Notes on Hybrids in *Drosera*, Kew Magazine 10:138-144.

Caught On The 'Net: A Regular Collection of Interesting Items Culled from the ICPS Internet Discussion Group

Edited by Jay Lechtman • 43498 Golden Meadow Cir. • Ashburn, VA 20147 • USA • L235@aol.com

Keywords: cultivation: planting media.

Live *Sphagnum* ... What Do I Do With It?

Matt Ouimette (777 W. Middlefield Rd., #193, Mtn. View, CA. 94043 USA, ermine@netscape.com) requested tips on growing live *Sphagnum*. "The tips helped, and the few sprigs I had are larger now. Now comes the real question," he writes. "What do I DO with it? When should I use live *Sphagnum* instead of peat? Should I plant my seeds on live *Sphagnum*, or on peat? When I repot plants this spring, should any of them be planted in the live *Sphagnum* instead of peat/sand/perlite?"

Rupert G. Goldie (2/47 Kawarren St, North Balwyn, Melbourne, Victoria, Australia 3104, epartg@epa.ericsson.se): "I started using *Sphagnum* moss as a potting medium for *Sarracenia* last year and I have been very happy with it. This year I have taken three divisions that I kept in the fridge over the winter and potted two into *Sphagnum* and one into peat/sand so I can compare the media. I have not used *Sphagnum* for seeds, but the few *Drosera* seeds that have spontaneously sprouted in the moss have been a bit overwhelmed by the moss."

David Mellard (3409 Regalwoods Dr., Doraville, GA 30340 USA, dam7@cdc.gov): "I planted *Sarracenia* seeds in live *Sphagnum* once and got rather poor germination. But then, that was when I was new to this obsession and may not have stratified the seeds prop-

Photograph by B. Meyers-Rice.

erly. Other people may have better experiences. I get good germination of *Sarracenia* on a peat/sand mix (1:1) and see no need to change. I have a few *Sarracenia* growing just in live *Sphagnum* and they do fine. One of the reasons I use live *Sphagnum* is that it is great for keeping the surface soil of your mix cool so I try to use it whenever I have a CP that is sensitive to heat. I think many of you know the next word: *Darlingtonia*. I also like using it in an aquarium with some plants planted directly in it and others in pots set into the live *Sphagnum*. I also like the aesthetics that it gives to some plantings and so would use it in some cases regardless of its benefits. It makes a nice top dressing for *Sarracenia*, either in a bog or in a pot. Smaller growing CPs may have a more difficult time treading the *Sphagnum*, which tends to overgrow them."

Phil Semanchuck (5000 Rollingwood Dr. Durham, NC 27713-8637 USA, pjs20347@glaxowellcome.com): "I keep all of my CPs in pots outdoors. I grow *Sphagnum* on all of the surface area surrounding the plants in the pots. I have been told that it helps to acidify the soil. In addition the live moss helps to prevent the soil from getting blasted out of the pot by hard rains. It looks nice, too—my red Venus Fly Trap looks 10 times better against a background of bright green *Sphagnum* than against dark peat."

Rick Carlstrom (3715 Lockwood Lane, Annandale, VA 22003, USA, carlstrom_rick@advmar.com): "I have quite a bit of *Sphagnum* growing on the top of my peat/sand mix used in planting *Sarracenia*. In my humble opinion: It's nicer to look at than just plain soil, it keeps the humidity higher, it's a lot easier to tell when squirrels have been digging in your plants and I think (maybe I am wrong) that it acts like a 'canary in a coal mine' as far as growing conditions are concerned. If the *Sphagnum* is thriving, then growing conditions are right. If it starts to die off, you should maybe check your soil/water/light conditions."

(I use pure live *Sphagnum* as a growing medium for the following species: *S. purpurea purpurea, D. rotundifolia, D.* × *beleziana, D. linearis, D. prolifera, D. adelae, U. cornuta, U. juncea* and *Darlingtonia californica*, all with good success. I am constantly amazed at the adaptability of CP species, particularly *Sarracenia*. In the wild, I have seen *S. flava*, for instance, equally happy in water-logged live *Sphagnum* as in comparatively dry peaty sand.—JL)

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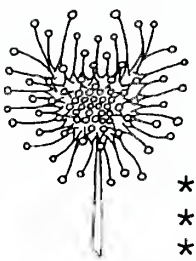

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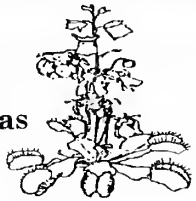

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Carnivorous Plants of the Northwest Territories

Chris Teichreb • #212-163 West 5th Street • North Vancouver, British Columbia • V7M 1J6 • Canada• cjteichr@sfu.ca

Keywords: travelogue: *Drosera rotundifolia*, Northwest Territories (Canada), *Utricularia macrorhiza*.

During the summers of 1997 and 1998 I had the unique opportunity to conduct my field research in the Mackenzie Delta near Inuvik, in the Northwest Territories, Canada. During my time there, I encountered a great variety of animal and plant life. As an intrepid carnivorous plant enthusiast, I searched high and low for the carnivorous plants which grow within this region. This is an account of my quests.

Inuvik's climate is extreme. Temperatures in the winter frequently dip below the -40°C (-40°F) mark, while summer temperatures can rise well into the 30's (approximately 95°F), occasionally making it Canada's hot spot. Precipitation is extremely low, with the majority falling as snow. Freezing temperatures can occur any day of the year. There are about six days of rain throughout the summer months (June to August), barely enough to rinse the dust off your boots—but a welcome respite from the Vancouver rains.

Even though the climate appears less than ideal for carnivorous plants, there are other factors which allow them to grow with great gusto! First, the entire region is situated over a layer of permafrost. Precipitation does not readily soak into the earth—it just sits there along with permafrost melt-waters. This provides a very wet, humid environment low in nutrients, perfect for the native species of carnivorous plants! In fact, a walk out on the tundra quickly reveals the majority of the ground to be covered with *Sphagnum*. Second, all that water means an ideal environment for insects, of which there are literally billions. Every horror story you have heard about the insects in the north are true, believe me! Finally, at latitudes north of 66.5° the summer means 24 hours of sun. Continuous sunlight occurs over the majority of the growing season, and the plants take full advantage of it. If you ever have the opportunity to visit this wonderful region, do not hesitate! There is so much to see, including carnivorous plants.

The carnivorous plant genera found in this region include *Utricularia*, *Drosera*, and *Pinguicula*. The most exciting carnivorous plant here is *P. villosa* which is restricted to far north regions, including the Canadian tundra. All species are capable of surviving this harsh climate through the formation of winter resting stages; turions and hibernacula. For anyone attempting to grow specimens from here, heed their dormancy requirements. If your winters do not go below freezing, you will likely have to make room in the freezer. Seeds should definitely be stratified for several months before sowing.

By far, the most common carnivorous plant occurring within the Inuvik region is *U. macrorhiza*. I found this in great quantities in the lakes I was working in, tangled among *Equisetum* and other emergent macrophytes. Water chemistry analysis indicated low (but present) nutrients and slightly alkaline pH. Strands I picked out of the water were at least one meter long or longer, although interestingly older sections appeared to be previous seasons' growth. All the bladders were full of insect larvae and small aquatic crustaceans. By the end of July 1998, I was treated to a show of blooms. Pictures of this flower do not do it justice! The small yellow flowers with the three red lines on the large upper palate are amongst the most beautiful I have seen, although I am biased towards carnivorous plants! By mid-August, the

large, walnut sized turions form and flowers die rapidly, another season being finished. While other species have been recorded as occurring within the lakes, I have never seen them.

To find the other carnivorous genera in this region you must head out towards the tundra. The tundra is thickly covered with willow (*Salix* spp.) and the ground is very hummocky, making walking difficult and treacherous. Combining this with the facts that mosquitoes are constantly trying to feast on your precious blood and the willows are just tall enough to hide grizzly bears, expeditions here are as exciting as searching for *Nepenthes* in rainforests anyday! Due to time constraints and difficulty hiking in this terrain, I was only able search for the remaining genera twice.

During my hikes, I came across the pretty *Drosera rotundifolia* growing wherever the *Sphagnum* grew (which is everywhere). Many leaves were curled tightly around their prey, and flowers were in full bloom. A small sense of satisfaction came from knowing they had trapped a few of the many biting insects.

To see the two *Pinguicula* species, one has to travel to the nearby Caribou foothills either by boat or by helicopter. There are no roads leading to this region, and hiking would require some mountaineering skills. I had arranged with the local helicopter company to take some pictures of my research area and then land in the foothills so I could search for *Pinguicula*. Unfortunately, this was not meant to be as wildfires ran rampant the summer of 1998 and required the attention of the region's small aircraft. However, I did get a first-hand account from a local naturalist who was conducting surveys. He noted that *P. vulgaris* was found in any wet depression, the soil being somewhat alkaline and calcareous. He described the scene as butterworts everywhere, about 5cm in diameter—true giants!

The carnivorous plant I dearly wanted to find was *P. villosa*. However, I believe both summers I arrived too late for flowers. The tiny rosettes are only a few millimeters in diameter and often buried in *Sphagnum* or other vegetation making locating them out of flowering season nearly impossible. However, herbarium specimens from the Inuvik Research Centre, indicate they are definitely in the area—a fine reason to head north some future summer.

I hope this article inspires you to search for carnivorous plants. There are many types, and they live in many different habitats. Perhaps your own backyard is a good place to start your search!

Figure 1: The Caribou foothills region, habitat for *P. vulgaris* and *P. villosa*.

Literature Reviews

Cheek, M. 1998, Proposal to Reject the Name *Drosera longifolia* (Droseraceae), Taxon 47: 749-750.

This proposal is (if it is accepted at the Botanical Congress) to end the repeated attempts to revive the ambiguous name *Drosera longifolia* (for the unambiguous but later names *D. anglica* and *D. intermedia*). The name *D. longifolia* has been rejected repeatedly by knowledgeable *Drosera* taxonomists like DeCandolle (1823), Planchon (1848), Diels (1906), and Wynne (1944). Only recent modifications of the International Code of Botanical Nomenclature have at all allowed doubts about the legitimacy of this sensible earlier decision. Therefore, the present formal proposal is very welcome, and it is hoped that reason will win over blind nomenclatural revisionism ("taxonomy drives nomenclature, not vice versa" is one of the principles behind the ICBN). (JS)

Schnell, D.E. 1998, A Pitcher Key to the Genus *Sarracenia* L. (Sarraceniaceae), Castanea 63(4): 489-492.

Schnell has published a nice, short set of keys that treat nearly all the accepted *Sarracenia* taxa (except hybrids). The first key treats the species, the second is for subspecies and varieties of *Sarracenia purpurea*, and the third is for *Sarracenia rubra* subspecies. The most notable feature of these keys is that they rely solely upon mature pitcher characters. Seasonal phenomena such as flower or phyllodia characters are not used. The keys are easy to use, and the only couplets I do not like are a few that depend upon dreaded relative features. One is in the first key, couplet 7, where *S. rubra* is separated in part from *S. alata* by relative venation features (e.g. abundant vs. few), the second is in the third key, couplet 4, again relying on venation features (e.g. strongly veined vs. weakly or not veined). Fortunately, these do not weaken the work as a whole. The only *Sarracenia* taxa not mentioned in this key are *Sarracenia purpurea* subsp. *venosa* var. *burkii* f. *luteola* and the seven varieties of *Sarracenia flava*. Descriptions of the pitchers for these plants can be found in previous issues of Carnivorous Plant Newsletter (1998, 27:4 for *S. flava*; 1998, 27:1 for *Sarracenia purpurea* subsp. *venosa* var. *burkii* f. *luteola*). (BAMR)

Sheridan, P.M., and Mills, R.R. 1998, Genetics of Anthocyanin Deficiency in *Sarracenia* L., HortScience 33: 1042-1045.

Classical genetic crossing experiments with green and wild type individuals of *S. rubra* subsp. *gulfensis*, *S. purpurea* (subsp. *purpurea*), *S. psittacina*, and *S. leucophylla* suggest that anthocyanin pigmentation (or rather the apparently monogenetic knock out mutation studied here; but cf. the article in CPN 27:3, 1998 that clearly shows the biosynthetic pathway to anthocyanins to involve several enzymes/genes, all of which could be affected by mutations) is controlled in all these taxa by two alleles (both copies in the diploid chromosome set) at a single locus, with red dominant to green. (JS)

Sheridan, P.M., Mills, R.R. 1998, Presence of Proanthocyanidins in Mutant Green *Sarracenia* Indicate Blockage in Late Anthocyanidin Biosynthesis Between Leucoanthocyanidin and Pseudobase, Plant Science 135: 11-16.

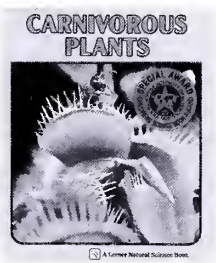
This paper offers the biochemical data missing in the previous one (a fine example how to publish one idea several times!), showing that the enzyme affected by the mutation responsible for lack of anthocyanins in several variants of *Sarracenia* (not necessarily in all known colour variants observed in the genus, see above) is catalyzing the conversion of colourless proanthocyanidins to red anthocyanidins. Proanthocyanidins were found even in green plants lacking anthocyanidins. Thus, anthocyanidin biosynthesis is blocked at a late stage in the route to these pigments. Although the analytical methods applied (acid hydrolysis, VIS specroscopy, solubility in amyl alcohol) are far from the state of the art and not suited to elucidate the chemical structures of the pigments found, circumstantial evidence indicates that the results and interpretations are correct. (JS)

Sorrie, B.A. 1998, Distribution of *Drosera filiformis* and *D. tracyi* (Droseraceae): Phytogeographic Implications, Rhodora 100: 239-260.

On the basis of different distribution patterns (augmented by morphological and ecological data), the author explains his opinion that the two taxa mentioned in the title should be separated as distinct species. This view has been held by several other authors. The other current interpretation is inclusion of both taxa as different varieties in *D. filiformis*. Perhaps it would be an acceptable compromise to classify them as (incompletely) geographically separated subspecies of *D. filiformis*. (JS)

Book Review

Overbeck, C. 1982, Carnivorous Plants, Lerner Publications Company, Minneapolis, ISBN 0-8225-1470-2, 48 p, 54 color photographs. Hard cover edition 19 × 23 cm (7.5 × 9 in), $22.60.



This book review is a little different because of two reasons. First, the book is a children's book, and we usually do not review the many such books published each year. Second, the book is very old. But let me tell you why this might be a nice addition to your library. The photographer, Kiyoshi Shimuzu, is an ingenious master of close-up photography, and the pictures make the book a bargain.

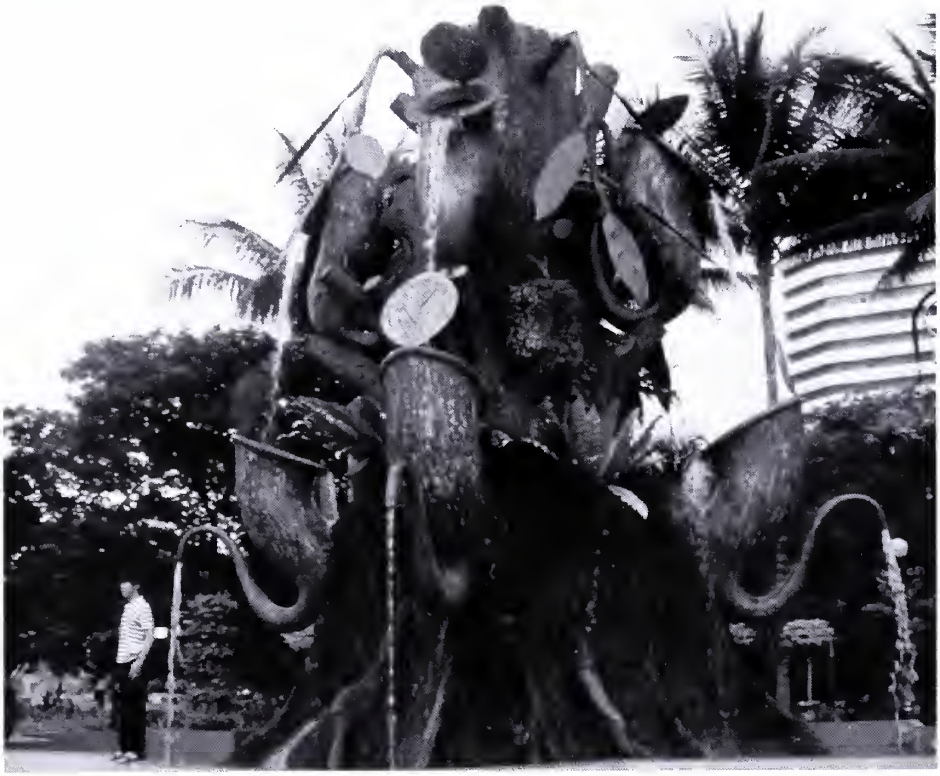
As you might expect, the book begins with a discussion of Venus Flytraps. Then it segues to, of all things, *Aldrovanda*! This baffled me until I learned about the Japanese origins of the work (It was first published under the title "Shokuchu shokubutsu.") The amazing photographs are the best I have ever seen of *Aldrovanda*, so I bought the book on the spot. There are also magnificent photographs showing insects being captured by *Drosera*, *Sarracenia*, *Nepenthes*, and *Utricularia*. In general the text is fine and does not oversimplify terminology or concepts. I would have loved this book as a child. (The New York Academy of Sciences also likes the book, because they gave it a "Children's Science Book Award.")

In summary, look for a copy and consider buying it for its great illustrations. If you know a child who is always asking about your plants, buy a copy for him or her, too. (BAMR)

News & Views

Barry Meyers-Rice (P.O. Box 72741, Davis, CA 95617 USA) says: "I am quite fond of Peter D'Amato's book, The Savage Garden (reviewed in CPN 27(3): 72), and had the pleasure of reviewing it for Pacific Horticulture magazine (Spring, 1999). Just a few days ago I learned that Peter won the coveted Book of the Year Award, given by the American Horticultural Society! This is a marvelous achievement, and will no doubt increase the popularity of carnivorous plant growing. Peter has long been a supporter of the ICPS (his first contribution to CPN was back in 1985), and his regular column, also called The Savage Garden, is a favorite among our readers. Congratulations are due all round to Peter."

John Randall (University of California, Davis CA 95616 USA) gave us a photograph of an amazing fountain he saw in Kuala Lumpur. This huge fountain is designed to look like a series of *Nepenthes* pitchers with water cascading from one pitcher to the next (sometimes spilling from pitcher mouths, other times improbably exiting the pitchers through their tendrils). Visitors to Kuala Lumpur should go to the north end of Merdeka Square, at the intersection of Jalan Raja Laut and Jalan Raja.



The gargantuan *Nepenthes* fountain.

Barry Meyers-Rice (P.O. Box 72741, Davis, CA 95617 USA) says: "The Nature Conservancy has been doing great work preserving carnivorous plant habitat! In the January/February issue of *Nature Conservancy*, the Florida chapter reported

protecting nearly 200 km^2 (50,000 acres) of land, including 3.6 km^2 (900 acres) of wetland *Sarracenia* habitat in the western part of the state. Meanwhile, in the May/June issue, the Alabama chapter reported having acquired one of the last wetlands where *Sarracenia rubra* subsp. *alabamensis* lives in the wild, and the Pennsylvania chapter purchased another 0.5 km^2 (113 acres) at the Thomas Darling preserve (see CPN 27:4, p123). If you would like to support any of these chapters in their efforts, contact the state office of your choice (TNC-Florida, 222 S. Westmonte Dr., #300, Altamonte Springs, FL 32714; TNC-Alabama, 2821-C 2nd Ave. S., Birmingham, AL 35233; TNC-Pennsylvania, 1100 E. Hector St., #470, Conshohocken, PA 19428)."

ICPS World Conference 2000 News: Registration and Photo Contest

Have you scheduled your trip to the ICPS June 16-18, 2000 conference in San Francisco yet? There will be nineteen speakers, three hands-on workshops, a banquet featuring a benefit auction of rare plants and unusual carnivorous plant memorabilia, and best of all: the opportunity to meet growers, explorers, botanists and researchers from around the world gathered in beautiful San Francisco. Enter soon to secure your place—seating is limited! Those who send in their registration deposit of $50 US by the end of September save $15 off the $100 cost of the conference.

The ICPS World Conference in 2000 will feature a photography contest and art exhibition. Our conference sponsors have generously donated prizes including carnivorous plant nursery gift certificates and ICPS memberships. Furthermore, the best of the entries will be published in Carnivorous Plant Newsletter! There will be prizes in the following six categories:

1. Carnivorous plants in habitat
2. Carnivorous plants in cultivation
3. Close-up or macro/micro-photography
4. Insect/animal interactions
5. Original art
6. People/carnivorous plant interactions

Honorable mentions will be awarded for other categories, such as best cultivated display or grouping, best plant in a decorative pot or planter, rarest/most beautiful species or cultivar, best photo from a person under 16, humor, etc.

Conference attendees may enter up to two photos or items per category at no charge. Others may enter up to two photos per category for $5 per category. Entries must be sent by June 15th, 2000, to: ICPS Photo Contest, 584 Castro St., # 687, San Francisco, CA 94114. Include a post-paid return envelope if you wish your prints returned (IRCs accepted). All submissions must be prints, at least 10 × 15 cm (4 × 6 inches), although 12 × 20 cm (5 × 8 in) is best.

Book Review

Simpson, R.B. 1994, Kew Conservation Review: Pitchers In Trade, Royal Botanic Gardens, Kew, ISBN 0-947643-65-6.

Somehow we missed reviewing this magazine-style publication from Kew. When I learned of this work I ordered it through the Australian Carnivorous Plant Society for about $15 AU. I work in conservation and was particularly looking forward to reading this work.

The book consists of 61 pages of text and black and white drawings. The first several pages provide a brief overview on carnivorous plants (overlooking Bromeliads), emphasizing taxa with CITES status. The next three chapters briefly describe each plant in the genera *Sarracenia*, *Darlingtonia*, and *Heliamphora*. The general morphology, taxonomy, distribution, habitat, cultivation, commercial trade, and conservation/protection status of each plant is noted. The book finishes with a flourish of references, keys and checklists, and glossaries of terms describing levels of endangerment.

This booklet is far too ambitious. It attempts to treat horticultural, taxonomic, general interest, and conservation topics, all in sixty pages of 1.5 line-spaced text. This cannot be done, so the result is unsatisfying. The horticultural discussions are peppered with odd claims (for example that *S. psittacina* must be overwintered underwater), and while all the remarks are backed by citations, the work reads as if it were written by an armchair horticulturist. Meanwhile, the taxon descriptions are brief and contain nothing that cannot be found in countless earlier publications—many pages could have been eliminated by making a reference to Schnell's book and a few updates in the literature. The *Sarracenia* key is faulty, being strongly based upon leaf and flower color. It is difficult to write a good key for *Sarracenia* (especially when using as old a reference as Godfrey and Wooten 1981), but mention should at least have been made of the many variant plant forms—the very types of greatest interest to the collector. My anthocyanin-free *S. rubra* subsp. *jonesii* keyed out to be *S. alata*, while spotted clones of *S. alata* could be classified as *S. minor*!

Certainly the booklet's most interesting content is its CITES data (Table 3). At times, staggering numbers of plants were reported as being shipped. For example, in 1988, 155,000 *S. leucophylla* plants were exported from the US (where are these plants coming from!) while only 107,000 of these plants were recorded as having been received. Clearly the numbers indicate the CITES monitoring is faulty. Indeed, the numbers of export shipments for the years 1987 to 1991 are 3, 59, 48, 22, 5. I doubt these numbers are really true—5 shipments in all of 1991? It seems that CITES monitoring has a long way to improve before its numbers are at all reliable.

As a general review on conservation, this booklet has many other glaring omissions. No discussions of total area of protected land (by private conservation organizations such as The Nature Conservancy or state and federal governents) or management issues (such as controlled burns, exotic species management, or poaching) are made or reviewed.

Finally, the selection of plants treated is peculiar. Why the "pitcher plants," (a designation made complete by a comparatively trivial treatment of *Heliamphora*) when the document would have been made far more interesting by including *Dionaea*—surely the single carnivorous plant most likely to be affected by trade issues?

I applaud the author for attempting to address conservation in carnivorous plants, but hope that future efforts will be more valuable. (BAMR)

Pinguicula vulgaris in Iceland

Robert Gibson • P.O. Box 1330 • Dubbo • New South Wales 2830 • Australia

Keywords: travelogue: Iceland, *Pinguicula vulgaris*

During early August, 1997, I participated in a hiking trip in southern Iceland. Aside from the stunning scenery and fascinating geology, I observed *Pinguicula vulgaris* in the wild.

Iceland is a young island in the middle of the north Atlantic Ocean, between Scotland and southern Greenland. It has been built from active volcanism over the last 14 million years (Einarsson, 1994). Whilst the island was named after the extensive ice caps which have developed during the present cool temperate climate, up until 3 million years ago the island had a warm temperate climate and a flora similar to that now found in the southeast of the United States of America.

On my trip *Pinguicula vulgaris* was seen to grow at elevations below 600 metres amongst moss in a range of habitats—from thin humus-covered basalt to peaty soil beside creeks and paths. The flat, bright green rosettes, measuring up to 15 cm across, had four to ten leaves and between zero and three scapes. New leaf production from the shallowly buried, bulb-like growing point had stopped for most plants, but the leaves had not yet started to die away. Many plants had open flowers and ripening fruit, and only a few were still developing scapes. The purple flowers up to 1 cm wide had white throats and palates, and short, subhorizontal spurs. The scape of each flower was curved over so that the petals hung below the calyx. However, after pollination the scapes straightened and the fruits were held erect—this may assist in wind dispersal of the seed. Very few insects were seen trapped on the leaves, and those seen appeared to be small (less than 2 mm long) flying insects. No insects were seen visiting the flowers, which might have the ability to self pollinate.

Pinguicula vulgaris is the most widespread of the three carnivorous plants usually recorded on Iceland, and is found almost everywhere save for the ice caps and surrounding desert-like plains. The other carnivorous plant species are *Drosera rotundifolia* and *Utricularia minor* (Taylor, 1989; Love, 1983), but they were not seen. *Drosera rotundifolia* reportedly grows in scattered coastal locations on the east, north, and especially west of the island. *Utricularia minor* is recorded from scattered lakes and old peat extraction pits. *Pinguicula alpina* has also been reported three times between 1785 and 1932 in the west and north-west of Iceland (Love, 1983). The presence of this species on Iceland, however, is disputable, and requires further field study.

It was a bonus to see *Pinguicula vulgaris* in the wild during my hike in Iceland. They were a wonderful complement to this amazing part of the world.

References:

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Love, A. 1983, Flora of Iceland, Almenna Bokafelagid, Reykjavik.

Taylor, P. 1989, The Genus *Utricularia*: A Taxonomic Monograph, Kew Bull. Add. Ser. 18, Her Majesty's Stationery Office, London.

Fly Fishing

David Crump • Carolina Carnivorous Gardens • 4174 Welling Avenue• Charlotte, NC 28208 • USA

Keywords: cultivation: *Dionaea muscipula*.

What is a fishing article doing in Carnivorous Plant Newsletter? Read on to see how one hobby interest can overlap with another!

When it gets hot in the Carolinas in late spring, the crappie and brim fishing slows down. At the same time, the large *Dionaea muscipula* plants which I have growing in redwood hot tubs are almost at their prime. There are probably two hundred or more in each of my tubs. It becomes very tedious trying to feed all those hungry mouths with crickets left over from the most recent fishing trip.

One day after a fishing trip I noticed about ten or so flies landing on a dead and stinking bait minnow. Wow! An idea came to me. What if I put the bait in the flytrap bog and see if it would draw flies to the awaiting open and hungry traps. I tried, and Whamo! it drew them like flies (pardon the phrase). On that day many traps got fed, and I just stood back and watched in total amazement.

On my next fishing trip I saved about thirty minnows for my bog tubs. First I let the minnows become really smelly, then I scattered them among the plants. The smell of the decaying minnows brought all the flies in the neighborhood to the awaiting *Dionaea*. And it was a great bargain—would you rather have more flies around, or happy traps smiling at you for your good deed?

On the day of my experiment, my friend Dr. Larry Mellichamp (from the University of North Carolina at Charlotte) came by and said, "This is the greatest thing since sliced bread!" We were both amazed at all the activity around the traps. Flies were everywhere—there must have been five hundred or more. The innocent flies were getting trapped and the ones that were lucky enough to escape would circle and come right back until they, too, succumbed to the snap-traps. We could not keep up with all there was to observe.

The activity did not slow down until sunset. It was then I realized what a great thing I had found, and that it should be shared with others. Try the fly-banquet yourself, but only do it only three or four times in a growing season. Too many flies may be as bad as not enough. Canned sardines would probably work if you cannot get bait minnows.

Fishing for flies can be fun, and look at all the time you will save by not having to hand feed all your beloved *Dionaea muscipula*. Enjoy!

Figure 1: A scene from David's weird backyard. Photo by L. Mellichamp.

Special Review: Artwork by Scott Bennett

R. Scott Bennett is a nationally established artist who has been painting plants, including carnivorous species, since the 1970s. His botanical illustrations are beautiful, detailed, and technically accurate. Executed in pen and ink and watercolor, his work has appeared on the covers of major journals such as HortScience (December, 1979) and American Horticulturist (August/September, 1979), as well as in Peter D'Amato's book, The Savage Garden (see the illustration credits listed on page 304 of that book). Bennett's work is skillfully executed and beautiful to see—I have some in my own house.

Now you can buy two of Bennett's creations yourself. The first is a watercolor print of *Sarracenia rubra* and *Pinguicula caerulea*. The piece falls into that peculiar arena of scientific art (like astronomical paintings) where beauty and scientific accuracy are both valued. The print works well on both levels, and conveys the charm and delicacy of the subjects. This limited edition (only 950 will be made) is numbered and signed by the artist, and measures a full 81 cm × 61 cm (32 inches × 24 inches). It costs $US85, and residents of New York must add sales tax. Shipping costs an additional $11.

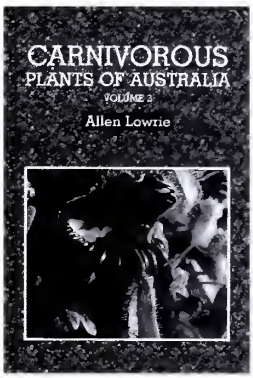
The other work is a custom offset litho printing of *Sarracenia leucophylla*, featuring pitchers and a flower. This is available in black and white for only $20, and a similar, but hand colored version, is available for $100. Both are printed on 140 lb cotton rag archival paper and measure 28 cm × 19 cm (11 × 7.5 in). New York residents must pay sales tax, and shipping is $5. A slightly cropped version of this can be seen on page 82 of D'Amato's book. This is a particularly nice litho, and I challenge anyone to find a technical flaw in the subject—two of the stigmatic surfaces are even visible!

This artwork can be purchased directly from Bennett at 423 Crawford Avenue, Syracuse, NY, 13224, email: Rspainter@aol.com. We are discussing the possibility of selling Bennett's work through the ICPS, so watch for further developments in CPN and on the ICPS web site. (BAMR)

Book Review

Lowrie, Allen. 1998. Carnivorous Plants of Australia, Volume 3. University of Western Australia Press, Nedlands, Western Australia. ISBN 1-875560-59-9, 288 p., approximately 350 photographs (most in color), 116 drawn figures. Hardback, 15 × 22 cm (6 × 8.5 in), $59.95.

Reviewed by Barry Meyers-Rice



In case you have not been paying attention, let me tell you about Allen Lowrie. He has been surveying the carnivorous flora of Western Australia for decades and has written two prior books—the first on tuberous sundews and the second on pygmies. The present volume treats fifty-eight Australian carnivores not included in the first two books (namely, *Utricularia*, *Drosera*, *Byblis*, *Aldrovanda*, *Cephalotus*, and *Nepenthes*). If you are interested at all in Australian carnivorous plants you should buy this book!

The format of this volume follows the same general formula as the first two. The first forty-seven pages consist of supporting information, including descriptions of habitats, notes on perennial tropical *Drosera*, botanical keys, and photographs of arthropods that live on sundews. Then the real meat begins—the descriptions of each species. In keeping with Lowrie format, each species is given four pages: one for descriptive text, one for a botanical drawing, one for color photographs, and one for a range map and captions. The descriptive text sections are good and the botanical drawings are well executed and clear, although many of the plates have much blank space that could have been used for additional sketches. (For example, Lowrie unfortunately did not include gemmae sketches for the new pygmy sundews.) The photography is excellent—as in his first two volumes Lowrie skillfully uses depth-of-field and background choices to highlight the plants. The addition of microphotographs is welcome. The ranges maps are fine, although not particularly detailed—Lowrie uses either a Western Australia template or a full continent template for all his range maps, so the ranges of species with eastern distributions are shown on a map of all Australia—why not use a close up map for these cases? In contrast with the first two books, all the species in this volume are arranged alphabetically, which is inconvenient if you are scanning for pygmy *Drosera* as opposed to tuberous or other types.

Even though this book is 50% bigger than Lowrie's previous two volumes, it could have been even bigger. It would have been nice if Lowrie broke from his rigid four-pages per species format to address the complicated taxa like *U. dichotoma* or *D. binata*. Most importantly, the treatment of *D. peltata* is lacking, for only the Western Australia type was ever mentioned (in Volume I). The genus *Utricularia* is also under-represented—only nineteen species are described, even though more than fifty species occur in Australia.

Even though this is supposedly the last book in the series, Lowrie recently named yet more new carnivorous species, and no doubt more species descriptions are in the works. Volume IV, Allen? I would buy it happily!

New Cultivar *Dionaea* 'Red Piranha'

Edward Read • 3940 West 119th Place • Hawthorne, CA 90250-3228 • USA

Keywords: cultivar: *Dionaea* 'Red Piranha'.

In 1995 I received seedlings of dentate Venus Flytraps (plants with triangular, toothlike marginal tentacles, or trap bars) from my friend Ivan Snyder. These were f5 plants derived from a dentate Venus Flytrap that was selected by Leo Song, Jr. many years ago from a batch of wild-collected plants. The plants I received lacked red coloration, but they gave me the idea to make a dentate Venus Flytrap that was intensely red.

On June 20, 1995 I crossed the dentate Venus Flytrap that had the most triangular trap bars with a red Venus Flytrap developed in Europe. The flower was emasculated to avoid self pollination. Ivan germinated the resulting seed—all these f1 plants were green. The fastest grower (which matured in eight months) with the best dentate trap bars was selected. Its flowers were self pollinated. Of the few hundred seedlings, one quarter had red coloration—the red coloration is apparently recessive. The plants varied greatly in trap bar size and shape, but one plant in particular was just what I wanted. Because it is red and has trap bars that look like piranha teeth, I named it *Dionaea* 'Red Piranha'.

As with other red Venus Flytraps the intensity of red coloration varies according to cultivation and season. It has been noted by growers who cultivate it next to other popular red Venus Flytraps that its red coloration equals, if not supercedes, their red color. With the help of my friend Ivan, my idea of a dentate Venus Flytrap with red coloration became reality. *Dionaea* 'Red Piranha' is a beautiful flytrap deserving a place in every plant collection.

Dionaea 'Red Piranha'

Special Review: Aquarium Cleaner

Reviewed by Barry Meyers-Rice

The scenario: Guests arrive at your house, "Ooh, show us your carnivorous plants!" You lead them to your largest terrarium, only to find that its contents are obscured behind a mist of annoying condensation clinging to the inside surface of the glass. So now you must remove the terrarium lid. To do this, you would have to unplug electrical connections first, then lift off fluorescent lights, move a few books, and so on. "Oh, forget it," you say, "Maybe another time." Another chance to convert someone into an ICPS member wasted!

Fortunately, there is a device (intended for saltwater and freshwater aquaria) that can save you from this predicament. The Magna Sweep™ aquarium cleaner consists of two powerful, matching, ceramic magnets (3cm × 11cm) encased in plastic. One is placed against the glass on the inside of a terrarium, the other on the outside of the terrarium—the potent magnetic field locks them together even through the glass. When you drag the outer magnet along the glass surface, the inner magnet follows it. The inner magnet (which is encased in plastic so it will not corrode) is mounted on a slightly abrasive surface that will not harm glass, but will clean algae off the wall—this is its primary benefit for those who use their terraria as aquaria.

Their are other magnetic aquarium sweepers available—if you are interested in such a device, you can probably find something similar at your nearest large aquarium dealer. The one I bought cost $12. If you have a misty terrarium, this device will make your plants more easily visible. You can be more vigilant for pests or exciting flowering events. Your guests will like your plants more, and may become smitten by carnivores. The ICPS membership will increase! Hail to the ICPS!

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H. ionasi (5-10, 2" traps)	$55
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N. burbidgeae	$85
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N. deaniana	$45
N. fusca	$25
N. gracilis	$10
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N. macfarlanei	$25
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N. maxima (vigorous easy grower!) (>6" rooted cutting)	$35
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N. rafflesiana	$15

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N. truncata	$35
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Please give your phone number, mailing address and E-mail address (if available) when ordering. All sale orders must be received before October 10, 1999 and payments before October 20, 1999. Plants will not be shipped between November 15 and March 15! Shipping costs: within U.S. (Priority Mail $10, Express Mail $23), outside U.S. (Air mail: ~$25, CITES: $17, Phytosanitary Certificate: $23. Prices are subject to change without notice. First to order will receive the plants currently available.

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International Carnivorous Plant Society Seedbank

Tom Johnson, Coordinator
P.O. Box 12281
La Crescenta, CA 91224-0981 USA
tom@carnivorousplants.org
http://www.primenet.com/~tjjohns/seed.htm

Darlingtonia californica
D. californica—Josephine Co., Oregon
D. californica—Nevada Co., California
Sarracenia flava
S. flava—Ben Hill Co., Georgia
S. flava—Fitzgerald, Ben Hill Co., Georgia
S. flava—Hampstead, NC
S. leucophylla
S. minor—Fitzgerald, Ben Hill Co., Georgia
S. purpurea subsp. *purpurea*
S. purpurea subsp. *purpurea*—north Ohio plains
S. purpurea subsp. *purpurea*—Manchester, NJ × *S. purpurea* subsp. *venosa*—Hampstead, NC
S. minor & *psittacina*—Fitzgerald, Ben Hill Co., Georgia, seeds mixed
Drosera aliciae—short leafed form
D. anglica—Switzerland
D. binata—Coromandel, NZ
D. burmannii—Beerwah, Queensland
D. burmannii—giant form, Mann River
D. capensis—green
D. capensis—narrow leaf
D. capensis—purple flower
D. capensis—red
D. capensis—white flower
D. capillaris
D. collinsiae
D. filiformis var. *filiformis*—North Carolina
D. filiformis var. *filiformis*—New Jersey pine barrens
D. filiformis var. *filiformis*—Manchester, New Jersey
D. intermedia—Carolina giant form
D. rotundifolia—Mendocino Co., California
D. rotundifolia—Nevada Co., California
D. rotundifolia—Manchester, New Jersey

Miscellaneous noncarnivores:
Ibicella lutea—5 seeds per packet
Mimosa pudica—sensitive plant

All seed contributions are gratefully accepted. You must use bubble wrap to protect the seeds from shipping damage.

The seed bank listing is only an approximation to the current seed bank inventory. Before ordering any seed you should request an updated listing from Tom Johnson (the Seed Bank Coordinator). A plant followed by an entry in parentheses means there are a limited number of seed packets remaining.

All orders and correspondence with the seed bank must be accompanied by a self addressed, stamped envelope. Postage is $.33 for a seed list, $.55 when ordering seed. Seed costs $1 per packet. IRCs are accepted. You should specify alternative seeds with each order in case your first choices are no longer in stock.